

Elektronisches Bauteil und Verfahren zu dessen Herstellung

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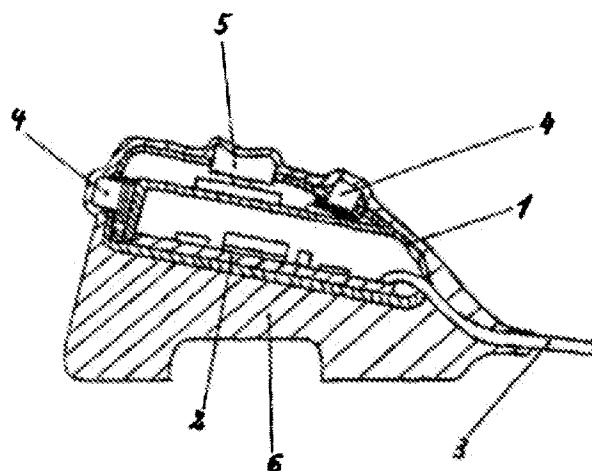
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Abstract of **DE19740382**

The invention relates to a mobile electronic component provided with externally actuatable control means for controlling its operation. In order to encapsulate this component in a waterproof way without impairing the actuation ability of its control means, this component, including its control means (4, 5), is fully and seamlessly wrapped in a highly flexible, soft, plastic sheath (6) which forms a layer at least in the region of the keys. The sheath is advantageously composed, in the region of the control means, of a plastic material softer than that in the other regions. Such a component is produced by fixedly applying on the component, preferably at least in the region of the control means, a thin layer of prefabricated plastic material, fitted to this region, and by applying then on the other regions a settable liquid plastic material which seamlessly mixes, upon setting, with said plastic layer.



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The invention relates to a part after the generic term of the claim 1 as well as a method to its preparation.

With from the outside operatable keys provided electronic parts cannot usually waterproof to be trained, since the movable keys require openings in the casing of the part, which not closely closed to become be able, without impairing key actuation.

There is however a substantial need at waterproof electronic parts, in particular if they are used as a computer mouse. If they are used for example in the medicinal range, then a disinfection is possible only if the part is not enclosed. This requirement exists also, if the environment, in which the part comes to the use, has a chemically aggressive or moist atmosphere.

It is therefore the task of the present invention to create a movable electronic part with from the outside operatable keys to the control of the function of the part which is waterproof enclosed without impairment of the possibility of key actuation. Further the task consists of indicating a preferential method for manufacturing a such part.

This task solved according to invention by the features indicated in the characteristic part of the claim 1. The method according to invention results from the features of the claim 12. Favourable training further of the part according to invention as well as the method according to invention result from the Unteransprüchen assigned in each case.

Because the part including the keys is completely and smoothly by one at least in the range of the keys foil-like trained, strongly flexible and soft casing from plastic surrounded, does not exhibit the part any openings, through which a gas or a fluid could penetrate into the inside of the part, and by the high flexibility this opposes both to an inside and a out movement during key actuation practically no resistor to the plastic foil within the key range. The function of the part is not thus impaired by the casing.

The keys of the part are preferably designed as short-stroke keys. Thereby it is guaranteed that the coating plastic foil in each position of the keys solid rests against these and forms with low pressure of a key no hollow foil bag.

Appropriately the casing is connected outside of the key range solid with the part, so that this cannot slip within the casing, whereby key actuation could be impaired.

Additionally to the keys or in place of these the part can be provided with at least a from the outside influenceable Sensore, whereby with use of a movement sensor the casing leaves the same freedom of movement to this as a key.

The casing exists favourably in the key range of a softer plastic than in the remaining ranges. Thereby the casing gives on the one hand to the part an additional mechanical strength, whereby it can be designed for example as foot, in order to give to the part a safe stall, and on the other hand key actuation is not impaired.

A preferential method for manufacturing a such element consists of the fact that at least within the key range this adapted, prefabricated thin plastic foil is put on solid to the part and on the remaining ranges a liquid, hardening plastic, which connects itself with the plastic foil when hardening smoothly is applied.

Thereby it cannot be achieved that the casing rests to solid against the key range, with this however is connected, so that a key actuation is not obstructed, while the remaining ranges of the casing solid are connected with the casing of the part. Also this method makes to make an in-hour casing of two plastics with different mechanical properties i.e. a very soft plastic within the range of the keys and a clearly firmer plastic possible within the remaining ranges.

The invention is more near described in the following on the basis embodiments represented in the figures. Show:

Fig. 1 a computer mouse in the cross section with a movement sensor, and

Fig. 2 a computer mouse in the cross section with a foil sensor.

Fig. 1 contains an actually well-known computer mouse with an housing 1 into which one with electronic components equipped printed circuit board 2 is, an electrical lead 3, from the outside of operatable keys 4 leading outward to the control of the function of the mouse as well as a movement sensor 5. The keys 4 and the movement sensor 5 are perpendicularly to the surface of the casing 1 more movable. They are preferably short-stroke elements, i.e., their movement stroke is relatively small.

Opposite a well-known computer mouse a plastic casing 6, which surrounds the casing 1 smoothly and with it gas and waterproof, is new. Only the lead 3 is passed through the casing 6, whereby however also this lead-through is waterproof trained.

The casing 6 is arranged as thin film over the keys 4 and the movement sensor 5, whereby it fits tightly these, without being connected with them however. It is thus a relative motion between the casing 6 and the keys 4 and/or the

movement sensor 5 possible.

Outside of the key range the casing 6 is connected and also more thickly designed solid with the housing 1 for preferably than the thin film over the keys 4 and/or. the movement sensor 5. Like that the casing 6 on the lower surface of the mouse foot or base-like is formed in the example shown, so that it guarantees a solid stall of the mouse on an underlay.

To making casing 6 first thin plastic foil manufactured, which the range of the keys 4 and the Bewegungssensors 5 covered and which are adapted to surface of the casing 1 in this range, from which the keys 4 and the movement sensor 5 stand out. This plastic foil is inserted into the outer contour of the entire casing 6 representing form, the casing 1 properly matching on the plastic foil is put and plastic-filled then the form with liquid, which hardens afterwards. A smooth connection connection between the edge of the plastic foil and the hardening liquid plastic takes place. For this it is not necessary that these plastics are each other identical. Therefore they can exhibit different mechanical properties; in particular the plastic foil should be very flexible and consist of soft material, while the plastic hardening in the form should possess a larger hardness, in order to give to the mouse a as large stability and a stability as possible. So the two plastics can consist of PU, which contain different diols.

The computer mouse after Fig. 2 differs from after Fig. by the fact 1 only that in place of the movement sensor 5 a foil sensor 7 is used. Otherwise the parts shown are identical.



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1. Movable electronic element with from the outside operatable keys to the control of the function of the part, characterised in that the part including the keys (4, 5) is completely and smoothly by one at least within the range of the keys (4, 5) foil-like trained, strongly flexible and soft casing (6) from plastic surrounded.
2. Part according to claim 1, characterised in that the keys short-stroke keys (4) are.
3. Structural part according to claim 1 or 2, characterised in that it a computer mouse with a mechanical from the outside influenceable sensor (5, 7) is.
4. Part according to claim 3, characterised in that the sensor a movement sensor (5) is.
5. Part according to claim 3, characterised in that the sensor a foil sensor (7) is.
6. Structural part after one of the claims 1-5, characterised in that it one waterproof by the casing (6) led electrical connecting cable (3) exhibits.
7. Structural part after one of the claims 1-6, characterised in that it by the casing (6) solid is enclosed.
8. Element after one of the claims 1-7, characterised in that the casing (6) outside of the key range solid is connected with the element.
9. Structural part after one of the claims 1-8, characterised in that the casing (6) in the key range from softer plastic exists than in the remaining ranges.
10. Structural part according to claim 9, characterised in that the casing (6) of PU with at least hardness than within the remaining ranges, smaller within the key range, consists.
11. Part after one of the claims 1-10, characterised in that the casing (6) in a range outside of the key range is foot-like trained.
12. Method for manufacturing a part after one of the claims is put on 1-11, characterised in that at least within the key range this adapted, prefabricated thin plastic foil solid to the part and afterwards on the remaining ranges a liquid, hardening plastic, which connects itself with the plastic foil when hardening smoothly, is applied.
13. Process according to claim 12, characterised in that for the plastic foil and liquid plastic of PU to be used, whereby the plastic foil is a soft plastic and the liquid plastic hardens to a hard plastic.